A New Proposal for the Target Value for Home BP in Type 2 Diabetes Patients: The J-HOP Study

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OBJECTIVE
The target levels of home-monitored blood pressure (BP) in patients with type 2 diabetes mellitus (T2DM) have not yet been established. We sought to examine the appropriate target home BP level in T2DM.

METHODS
This is a subanalysis of the Japan Morning Surge-Home Blood Pressure (J-HOP) study. We enrolled 4,310 patients who had at least 1 cardiovascular risk factor, and clinic and home BP monitoring was performed. The urinary albumin-to-creatinine ratio (UACR) was measured as a marker of microvascular disease. Quadratic equations of the relationship between clinic/home systolic BP (SBP) and log-transformed UACR were used to determine the home BP value. Home BP levels corresponding to clinic SBP/diastolic BP (DBP) level using the UACR values were calculated separately by the presence/absence of diabetes.

RESULTS
The mean age of the patients was 64.9 ± 10.9 years; 47.0% were males. Of the 4,310 subjects enrolled, 1,057 (24.5%) had T2DM (the DM group) and 3,253 (75.5%) did not (non-DM group). The home BP levels equivalent to clinic BP 140/90 mm Hg were 135/84 and 135/83 mm Hg in the DM and non-DM groups, respectively. The home SBP levels equivalent to clinic SBP 130/80 mm Hg were 122/79 mm Hg in the non-DM group and 129/78 mm Hg in the DM group.

CONCLUSIONS
Regardless of diabetic status, the home BP level that corresponds to the clinic SBP 140/90 mm Hg was 135/85 mm Hg. In patients with T2DM, the home SBP level equivalent to clinic SBP 130/80 mm Hg was 129/78 mm Hg with regard to the extent of microvascular disease.

Keywords: blood pressure; home BP; hypertension; type 2 diabetes; urinary microalbumin.

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Home blood pressure monitoring (HBPM) has been shown to be a useful tool for the management of hypertension. Compared to clinic BP monitoring, HBPM is more closely associated with target organ damage and cardiovascular prognosis (especially stroke events). In many international hypertension guidelines, HBPM has been described as an important tool for the management of hypertension; however, the use of HBPM is not very popular in the primary care settings in the US survey.

In patients with diabetes, the tight control of BP has been shown to be essential for improving cardiovascular prognoses. It has been found that the control of BP is a strong determinant in predictions of microvascular and macrovascular complications independent of glycemic control per se. It was also pointed out that it is difficult to control the BP of diabetic individuals because their BP fluctuates so much and is sometimes vulnerable to the white-coat effect. Therefore, it is recommended that out-of-office BP monitoring is favorable for the management of hypertension in individuals with type 2 diabetes.

In the Japanese hypertension guidelines issued in 2009, the goal of home BP level for patients with type 2 diabetes was set at less than 125/75 mm Hg based on the consensus of the guideline committee. However, it was not established how low the home BP level should be in these patients because the evidence supporting this is lacking. In the latest version of the American Diabetes Association clinical management guidelines and the Eighth Joint National Committee hypertension guideline, the goal clinic BP in type 2 diabetes was raised to 140/90 mm Hg based on the results of the Action to Control Cardiovascular Risk in Diabetes trial. The objective of this study was to explore the target home BP levels from the evidence supporting the use of renal target organ damage, urinary albumin-to-creatinine ratio (UACR), in patients with type 2 diabetes and nondiabetes. In other words, target-organ-damage-driven definition of BP threshold was explored.

MATERIALS AND METHODS

Subjects
All of the subjects in this study were participants enrolled in the Japan Morning Surge-Home Blood Pressure (J-HOP)
The hypertensive subjects had been under stable antihypertensive treatment for 3 months. The institutional review board of the Jichi Medical University School of Medicine approved this study, and written informed consent was obtained from all participants in the J-HOP study. Between January 2005 and May 2012, 4,310 consecutive patients were enrolled in the J-HOP study by 75 doctors at 71 institutions (45 primary practices, 22 hospital-based outpatient clinics, and 4 specialized university hospitals) throughout Japan. The protocol of the J-HOP study has been registered on the University Hospital Medical Information Network Clinical Trials Registry website under the trial number UMIN000000894. Briefly, the J-HOP study is a prospective observational study being conducted to evaluate the predictive values of home BP for cardiovascular events in Japanese subjects with any of the following cardiovascular risk factors: hypertension, impaired glucose tolerance or diabetes, dyslipidemia, smokers (including those with chronic obstructive pulmonary disease), chronic renal disease, atrial fibrillation, metabolic syndrome, or sleep apnea syndrome.

The exclusion criteria in the J-HOP study were a recent event (i.e., myocardial infarction, stroke, transient ischemic attack, unstable angina, heart failure, renal failure), current heart failure treatment, atrial fibrillation, metabolic syndrome, or sleep apnea syndrome.

Hypertension was defined as clinic systolic BP (SBP) ≥ 140 mm Hg and/or diastolic BP (DBP) ≥ 90 mm Hg or the patient being on antihypertensive medication. Impaired fasting glucose was defined as fasting glucose levels ≥ 110 mg/dl, and impaired glucose tolerance was defined as glucose levels of ≥ 140 mg/dl at 2 hours after a 75-g oral glucose tolerance test. In the present substudy, diabetes was defined as one or more of the following: self-report, the use of diabetes medication, fasting plasma glucose ≥ 126 mg/dl, or hemoglobin A1c (National Glycohemoglobin Standardization Program) ≥ 6.5%. Diagnosis of type 2 diabetes was based on typical clinical features such as gradual onset of diabetes, presence of previous or current obesity, positive family history of diabetes, dyslipidemia, insulin independent, excluding subjects with apparent type 1 diabetes, insulin dependency, and other specific causes of diabetes. Dyslipidemia was defined as one or more of the following: self-report, total cholesterol level ≥ 240 mg/dl, triglycerides ≥ 150, high-density lipoprotein < 40 mg/dl, or a treatment for hyperlipidemia. Chronic renal disease was defined as the presence of proteinuria or serum creatinine levels ≥ 1.1 mg/dl. Metabolic syndrome was defined according to the guidelines of the Examination Committee of Criteria for Metabolic Syndrome in Japan. Sleep apnea syndrome was defined as an apnea–hypopnea index of ≥ 15 events/hour as measured by overnight sleep polysomnography.

Blood pressure measurements

Clinic BP. Clinic BP was measured by physicians or nurses using an upper arm cuff oscillometric BP device (HEM-5001; Omron, Kyoto, Japan). Arm circumference was measured and the appropriate cuff size was selected. Three clinic BP readings were taken at 15-second intervals with the patient in a sitting position after 2 minutes of rest. The clinic BP analysis was conducted using the average of 6 readings from 2 clinic visits by the patient (before and after the home BP measurements). We advised the patients to take their morning medication as usual even on the days when they were visiting the clinic.

Home BP. The self-measured home BP was taken using a validated upper arm cuff oscillometric device (HEM-5001; Omron). Patients were instructed to place the cuff on the same arm throughout the measurements, and to measure BP in a sitting position after at least 2 minutes of rest, according to the Japanese Society of Hypertension 2009 guideline. Each patient took 3 home BP readings at 15-second intervals in the sitting position in both the morning and evening for 14 consecutive days. Morning BP was measured within 1 hour after waking up, after urination, before breakfast, and before taking antihypertensive medication. Evening BP was measured before going to bed, and the patients were instructed to avoid measuring BP just after taking a bath, drinking alcohol, or smoking. The morning and evening BP data were automatically stored in the BP device’s memory, and a physician or nurse downloaded the BP data to a computer during the patient’s clinic visits. Average home BP was defined as the average of the morning and evening BP readings taken at home (“ME average” of home BP).

Blood and urine samples

Blood samples were drawn from the antecubital vein of the patient in an overnight fasting state at the second clinic visits. All blood samples were measured in a single laboratory (SRL, Tokyo, Japan). The UACR was calculated by the laboratory.

Determination of BP levels using the UACR

We plotted the relationship between the clinic and home BP values and a measure of hypertensive target organ damage (i.e., the UACR). It is shown as quadratic equation lines in the SPSS file (IBM-SPSS, Armonk, NY). We determined the UACR values that correspond to each clinic SBP/DBP levels, and home BP levels corresponding to these UACR values were calculated separately by the presence/absence of diabetes. The method is illustrated in Supplementary Figure S1.

Determination of BP levels by the linear regression method

Based on an earlier study, we also determined the home BP levels by the linear regression method from the correlation between clinic BP and home BP. Average home BP was defined as the average of the morning and evening home SBP and DBP values in the patients with diabetes mellitus (DM group: n = 1,057) and the patients without DM (non-DM: n = 3,253).

For SBP, the following equations, derived from the correlation between clinic BP and home ME average BP in the present study, were used to calculate target home BP levels (linear regression methods):
RESULTS

In this subanalysis of the J-HOP study, we looked at the impact of BP separately in patients with diabetes and those without diabetes. The mean age of the 4,310 subjects enrolled was 64.9 ± 10.9 years, 47.0% were males, and 87.1% had hypertension; 1,057 (24.5%) patients had type 2 diabetes (the DM group) and the other 3,253 (75.5%) comprised the nondiabetes (non-DM) group. The baseline characteristics of the DM and non-DM groups are shown in Table 1.

Although the ages of the 2 groups of patients were similar, the following parameters were significantly higher in the DM group than the non-DM group: the percentage of males, body mass index values, histories of angina and myocardial infarction, history of hypertension, rate of renal dysfunction, and rate of dyslipidemia. However, the rate of hypertension was significantly lower in the DM group than in the non-DM group. Fasting glucose, hemoglobin A1c, fasting insulin, and Homeostasis Model Assessment-insulin resistance index were also higher in the DM group than the non-DM group. In the DM group, 53.5% of patients were on diabetic medications (oral diabetic drugs and/or insulin).

Table 2 shows the comparison of clinic and home BP measures between the DM and non-DM groups. Although the clinic SBP values were similar between the 2 groups, the home morning and evening SBP values were higher in the DM group, but the clinic DBP and home DBP values were significantly lower in the DM group compared to the non-DM group. The clinic and home pulse rates were also higher in the DM group than the non-DM group.

Figure 1 provides the scatterplots and quadratic curves of the clinic and home SBP values of the DM and non-DM patients. With regard to clinic SBP, on the same clinic level, the UACR values were higher in the DM group than in the non-DM group in all BP ranges, and the tendency was prominent in the higher range (>160 mm Hg). With regard to the home ME average SBP values, the curves got steeper, but the difference between the DM and non-DM groups did not change in the higher BP levels.

Figure 2 shows the scatterplots and quadratic curves of the clinic and home DBP values of the 2 groups. The curves were U shaped, and the relationship between DBP and UACR was steeper for home DBP than for clinic DBP. However, the UACR was constantly higher in the DM group than in the non-DM group.

The home SBP/DBP levels corresponded to the clinic SBP/DBP level by the UACR levels in both the DM and non-DM patients are shown in Figure 3. The home SBP levels that correspond to the clinic SBP values 140, 150, and 160 mm Hg were 135, 142, and 150 mm Hg, respectively, in the DM group and 135, 142, and 149 mm Hg, respectively, in the non-DM group. However, with regard to the clinic SBP values 130, 120, and 110 mm Hg, the corresponding home SBP levels were 122, 116, and 100 mm Hg, respectively, in the non-DM group, but 129, 123, and 118 mm Hg in the DM group.

With regard to DBP, the home DBP levels that correspond to the clinic DBP values 80, 90, and 100 mm Hg were 78, 84, and 91 mm Hg, respectively, in the DM group and 79, 83, and 90 mm Hg, respectively, in the non-DM group. The values of clinic DBP <80 mm Hg were also similar between the DM and non-DM groups.

When we performed the reverse analyses, i.e., clinic BP levels that correspond to the given home BP levels (Figure 4), the relationship was similar to the results shown in Figure 3. The clinic SBP values that corresponded to home SBP 130 and 135 mm Hg were 133 and 140 mm Hg, respectively, in the DM group and 134 and 141 mm Hg, respectively, in the non-DM group. The clinic DBP values that corresponded to home DBP 80 and 85 mm Hg were 84 and 91 mm Hg, respectively, in the DM and 84 and 93 mm Hg, respectively, in the non-DM group.
Table 1. Baseline characteristics of the patients with diabetes mellitus (DM) and those without DM (non-DM)

<table>
<thead>
<tr>
<th></th>
<th>DM (n = 1,057)</th>
<th>Non-DM (n = 3,253)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>65.1 ± 9.8</td>
<td>64.8 ± 11.3</td>
<td>0.361</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>547 (51.8)</td>
<td>1,483 (45.6)</td>
<td>0.001</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>25.0 ± 3.9</td>
<td>24.1 ± 3.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>History of angina N (%)</td>
<td>96 (9.1)</td>
<td>212 (6.5)</td>
<td>0.005</td>
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<tr>
<td>History of MI N (%)</td>
<td>60 (5.7)</td>
<td>107 (3.3)</td>
<td>0.001</td>
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<tr>
<td>History of CI N (%)</td>
<td>46 (4.4)</td>
<td>130 (4.0)</td>
<td>0.593</td>
</tr>
<tr>
<td>History of CHF N (%)</td>
<td>21 (2.0)</td>
<td>53 (1.6)</td>
<td>0.416</td>
</tr>
<tr>
<td>Hypertension N (%)</td>
<td>853 (81.2)</td>
<td>2,899 (89.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>History of hypertension (years)</td>
<td>8.9 ± 9.7</td>
<td>7.5 ± 8.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>History of hypertension treatment (years)</td>
<td>7.4 ± 8.6</td>
<td>5.9 ± 7.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Current smoking N (%)</td>
<td>144 (13.6)</td>
<td>382 (11.7)</td>
<td>0.104</td>
</tr>
<tr>
<td>Hyperlipidemia a N (%)</td>
<td>697 (66.1)</td>
<td>1,836 (56.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Renal dysfunction N (%)</td>
<td>59 (5.6)</td>
<td>129 (4.0)</td>
<td>0.03</td>
</tr>
<tr>
<td>Atrial fibrillation N (%)</td>
<td>42 (4.0)</td>
<td>119 (3.7)</td>
<td>0.64</td>
</tr>
<tr>
<td>Total cholesterol (mg/dl)</td>
<td>200 ± 34</td>
<td>203 ± 33</td>
<td>0.022</td>
</tr>
<tr>
<td>Triglycerides (mg/dl)</td>
<td>135.5 ± 92.6</td>
<td>122.8 ± 86.5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HDL cholesterol (mg/dl)</td>
<td>55.6 ± 15</td>
<td>58.2 ± 15.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>0.76 ± 0.25</td>
<td>0.75 ± 0.25</td>
<td>0.35</td>
</tr>
<tr>
<td>Fasting plasma glucose (mg/dl)</td>
<td>137 ± 40</td>
<td>98 ± 10</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hemoglobin A1c N (%)</td>
<td>6.4 ± 1</td>
<td>5.1 ± 0.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Insulin (μIU/ml)</td>
<td>14.0 ± 19.9</td>
<td>8.2 ± 8.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HOMA-R</td>
<td>5.1 ± 8.2</td>
<td>2.0 ± 2.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Urinary albumin b (mg/gcr)</td>
<td>25.8 ± 4.3</td>
<td>15.6 ± 3.2</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

DM was defined as self-report, diabetes medication, Fasting plasma glucose ≥ 126 mg/dl, or hemoglobin A1c (National Glycohemoglobin Standardization Program) ≥ 6.5%.

Abbreviations: CHF, congestive heart failure; CI, cerebral infarction; HDL, high-density lipoprotein; HOMA-IR, Homeostasis Model Assessment-insulin resistance; MI, myocardial infarction.

Hyperlipidemia was defined as self-report, Total cholesterol ≥ 240, triglycerides ≥ 150, HDL < 40 mg/dl, or the use of lipid-lowering drugs.

Data of urinary albumin are geometric mean.

Table 2. Comparison of clinic BP and home BP values in the DM and non-DM groups

<table>
<thead>
<tr>
<th></th>
<th>DM (n = 1,057)</th>
<th>Non-DM (n = 3,251)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic SBP (mm Hg)</td>
<td>142 ± 17</td>
<td>141 ± 16</td>
<td>0.32</td>
</tr>
<tr>
<td>Clinic DBP (mm Hg)</td>
<td>79 ± 10</td>
<td>82 ± 11</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Clinic PR (mm Hg)</td>
<td>72 ± 11</td>
<td>71 ± 11</td>
<td>0.001</td>
</tr>
<tr>
<td>ME average of home SBP (mm Hg)</td>
<td>137 ± 15</td>
<td>134 ± 14</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ME average of home DBP (mm Hg)</td>
<td>75 ± 9</td>
<td>76 ± 9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Home morning SBP (mm Hg)</td>
<td>140 ± 16</td>
<td>138 ± 16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Home morning DBP (mm Hg)</td>
<td>78 ± 10</td>
<td>80 ± 10</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Home morning PR (bpm)</td>
<td>66 ± 9</td>
<td>65 ± 9</td>
<td>0.001</td>
</tr>
<tr>
<td>Home evening SBP (mm Hg)</td>
<td>133 ± 15</td>
<td>130 ± 15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Home evening DBP (mm Hg)</td>
<td>72 ± 10</td>
<td>73 ± 10</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Home evening PR (bpm)</td>
<td>71 ± 10</td>
<td>70 ± 10</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Abbreviations: DBP, diastolic blood pressure; DM, diabetes mellitus; ME average, average of morning and evening BP; PR, pulse rate; SBP, systolic blood pressure.
Lastly, we performed a regression analysis to determine the home BP level that corresponds to clinic BP. As shown in Table 3, the home BP level that corresponds to 140/90 was 133.3/81.3 mm Hg in the non-DM patients and 135.7/81.5 mm Hg in the DM patients. The home BP levels that corresponded to 130/80 mm Hg were 128.7/75.3 mm Hg in the non-DM group and 131.0/75.3 mm Hg in the DM group.

DISCUSSION

In this study, we sought to determine the adequate home BP level using the measure of hypertensive target organ damage in treated DM and non-DM subjects. We found that in the DM group, the home BP levels of 130, 135, 140, and 150 mm Hg correspond to the clinic SBP levels 130, 140, 150, and 160 mm Hg, respectively.

Target home BP level

In the present study, the home BP values that corresponded to the clinic BP level of 140/90 mm Hg based on the measurement of urinary microalbumin and linear methods were 135/83 and 133/81 mm Hg, respectively, in the non-DM group. The target home BP level in hypertensive patients has been established.9,10,29 Two methods, the percentile method and regression method, have been used for the evaluation of home BP equivalent to 140/90 mm Hg. Thijs et al.28 performed a meta-analysis using 2 techniques to determine the home BP equivalent to clinic BP 140/90 mm Hg: the regression method gave a value for the home BP of 125/79 mm Hg, and the percentile method gave a value of 129/84 mm Hg.

In the Pressioni Arteriose Monitorate E Loro Associazioni (PAMELA) study, the home BP equivalent to clinic BP of 140/90 mm Hg was 133/82 mm Hg by the linear regression method.30 In the Ohasama study, the value of home BP above 137/84 mm Hg was found to be associated with increased mortality.31 Based on these observations, the home BP value of 135/85 mm Hg was adopted as a reference value of home BP in various guidelines.9,10,29 In the present study, the use of urinary microalbumin to determine the threshold level of BP was justified in the analysis of the non-DM population.

Home BP study in diabetes

Target home BP values in type 2 diabetes could be the same as in nondiabetes, which have never been reported. In the present study, in the DM group, the home BP values

Figure 1. Scatterplots and quadratic curves of clinic and home morning–evening (ME) average of systolic blood pressure (SBP) in patients with diabetes (green circles and lines) and nondiabetes (blue x and lines). Dotted lines indicate 95% confidence intervals in diabetes (green lines) and nondiabetes (blue lines). Abbreviation: UACR, urinary albumin-to-creatinine ratio.

Figure 2. Scatterplots and quadratic curves of clinic and home morning–evening (ME) average of diastolic blood pressure (DBP) in patients with diabetes (green circles and lines) and nondiabetes (blue x and lines). Dotted lines indicate 95% confidence intervals in diabetes (green lines) and nondiabetes (blue lines). Abbreviation: UACR, urinary albumin-to-creatinine ratio.
that corresponded to clinic BP 140/90 mm Hg based on the urinary microalbumin and linear methods were 135/83 and 135.7/81.5 mm Hg, respectively. These values were almost the same as the values in the non-DM group. It is still not established how low the target BP should be in patients with DM. Lower office BP goals have been recommended for certain patients such as those with diabetes or renal failure.9,29,32 With regard to home BP, a 5-mm Hg lower home BP goal compared to office BP was recommended.9 However, in recent studies, the home BP levels were almost equivalent to clinic BP levels in the lower range of BP.33

Although the target BP level 125/75 mm Hg was set in the JSH2009 guideline, the value was set simply by a consensus of experts,9 and no such recommendation was reported in the other international hypertension guidelines. The HOMED BP study tried to set the target home BP level of patients with type 2 diabetes.20 Although the importance of home BP in type 2 DM was confirmed, that study was not set up to determine the validity of the home BP level in DM.

In patients with diabetes, it is very important to reduce urinary microalbumin for a number of reasons. Urinary microalbumin is not only a marker of microvascular disease, it is also a surrogate marker of future cardiovascular events in individuals with type 2 DM34 and even in the general population.35 Urinary microalbumin is associated with endothelial function and vascular function.36 The reduction of microalbuminuria in patients with type 2 DM was an integrated indicator for renal and cardiovascular risk.
Our method is appropriate to determine the target BP level using the home BP. As was done in the Ohasama study, it would be ideal to look at the future cardiovascular events to determine the threshold level of home BP. However, the population of diabetic patients is very heterogeneous, and fatal or nonfatal events other than cardiovascular events are quite common, and thus, the occurrence of cardiovascular events is not always suitable in determining the BP level. We, therefore, believe that our method is appropriate to determine the target home BP level in patients with diabetes.

**Strengths**

Over 4,000 subjects recruited from multiple centers in Japan provide the greatest strength of the present study using home BP monitoring. Most of these subjects are seen by primary care physicians. The definition of type 2 diabetes was strictly set using updated guidelines. Home BP monitoring was performed for 14 days, and the results were averaged with morning and evening.

**Limitations**

There are some limitations in this study. First, the patients' antihypertensive treatments were not analyzed; however, antihypertensive treatments are commonly used in patients with type 2 diabetes and were not considered a confounding factor in this study. Second, the analysis with quadratic curves did not establish a relationship between clinic and home BP levels and urinary albumin. However, the quadratic equation had a better fit for this relationship compared to the linear regression. Left ventricular mass index (LVMI), intima-media thickness (IMT) and estimated glomerular filtration rate (eGFR) were not appropriate to use to determine the BP levels as was performed with UACR. The number of LVMI and IMT data were limited, and the correlations with BP levels were weaker than UACR, because the other factors such as insulin resistance for LVMI, and smoking and lipid for carotid IMT, have large impact. eGFR is highly dependent on age and gender. The wide 95% confidence interval between BP and UACR shown in Figures 1 and 2 seems to be poorly reproducible. However, UACR is used just for connecting the equations of clinic BP and home BP shown in Supplemental File 1, and wide 95% confidence interval does not always mean that clinic BP–home BP relationship is not reproducible. Therefore, we believe that the analysis is appropriate and better than linear regression analysis.

**Conclusions**

Regardless of the patients’ diabetic status, the home BP level that corresponded to clinic SBP 140/90 mm Hg was about 135/85 mm Hg. In the patients with type 2 diabetes, the home SBP level equivalent to clinic SBP 130/80 mm Hg was 129/78 mm Hg with regard to the extent of microvascular disease. These results indicate that the home BP target in patients with type 2 diabetes could be the same as that for nondiabetic hypertensives in relation to the extent of microalbuminuria.

**Supplementary Material**

Supplementary materials are available at American Journal of Hypertension (http://ajh.oxfordjournals.org).

**Participants and Participating Centers**

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DISCLOSURE

The authors declared no conflict of interest.

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